

What is Claimed is:

1. A fluid ejection device comprising:
a substrate having a first surface;
a fluid ejector formed over the first surface; and
5 a cover layer defining a firing chamber formed about the fluid ejector, and
defining a nozzle over the firing chamber,
wherein the cover layer is formed by at least two SU8 layers.
2. The fluid ejection device of claim 1 wherein each of the SU8 layers are
10 formed from the same material.
3. The fluid ejection device of claim 2 wherein each of the SU8 layers are
processed differently.
- 15 4. The fluid ejection device of claim 1 wherein the cover layer has a primer
layer, and a nozzle layer, wherein the primer layer has a thickness that is less
than 50% of the thickness of the cover layer.
- 20 5. The fluid ejection device of claim 4 wherein the primer layer has a thickness
of about 2 microns.
6. The fluid ejection device of claim 4 wherein the primer layer is a low
viscosity SU8 cured at 210°C.
- 25 7. The fluid ejection device of claim 1 wherein the cover layer has at least three
layers including a primer layer coating thin film layers, a chamber layer
defining the firing chamber, and a nozzle layer defining the nozzle.
- 30 8. The fluid ejection device of claim 7 wherein the chamber layer is SU8 with
photobleachable dye.

9. The fluid ejection device of claim 1 further comprising a top coat layer formed over the cover layer.

10. The fluid ejection device of claim 9 wherein the top coat layer is photodefinable.

11. The fluid ejection device of claim 1 wherein at least one of the SU8 layers are patterned using at least one of the following methods: dry etch, wet etch, UV assisted wet etch, exposure and developing, DRIE, and UV laser machining.

12. The fluid ejection device of claim 1 wherein at least one of the layers of the cover layer is formed by a lost wax method.

13. The fluid ejection device of claim 1 wherein the materials for the layers of the cover layer are chosen for at least one of the following characteristics: CTE matching, ink resistance, stress relief, non-wetting ability, wetting ability, ability to photocure, high resolution processing capability, smooth surface, compatibility, and intermixing capability.

14. The fluid ejection device of claim 1 wherein at least one of the layers of the cover layer is formed of a dry film.

15. The fluid ejection device of claim 1 The fluid ejection device of claim 1 wherein the cover layer has at least four layers including a primer layer coating thin film layers, a chamber layer defining the firing chamber, a photon barrier layer with a nozzle layer defining the nozzle.

16. The fluid ejection device of claim 15 wherein the corner edges between the nozzle and the chamber, and defined by the photon barrier layer are substantially square.

17. An ink ejection device comprising:
a substrate having a first surface;
a thin film stack defining an ink ejector and formed over the first surface; and
5 a cover layer having a primer layer over the thin film stack, a chamber layer over
the primer, and an orifice layer over the chamber layer, wherein the primer layer
substantially adheres to the thin film stack and to the chamber layer, wherein the primer
layer is substantially resistant to ink, wherein the chamber layer defines a firing chamber
about the ink ejector, wherein the orifice layer defines an orifice over the firing
chamber.

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18. The ink ejection device of claim 17 wherein the chamber layer is formed
with photobleachable dye for z contrast.

19. A method of forming a fluid ejection device comprising:
15 coating a thin film stack, including a fluid ejector, with a first material;
exposing the first material to form a first SU8 cover layer;
coating the first material with a second material;
exposing the second material to form a second SU8 cover layer; and
developing the first and second material such that the first and second SU8 cover
20 layers define a firing chamber about the fluid ejector and a nozzle.

20. The method of claim 19 wherein before the second material is coated, a
photon barrier layer is coated over the first material, wherein the photon barrier layer is
exposed with the second material.

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21. A method of forming a fluid ejection device comprising:
- coating a thin film stack, including a fluid ejector, with a first material;
 - exposing the first material to form a first SU8 cover layer;
 - coating the first material with a second material;
 - 5 exposing the second material to form a second SU8 cover layer defining a chamber;
 - developing to remove the unexposed second material from the chamber;
 - filling the chamber with resist;
 - planarizing the resist;
 - 10 coating the resist with a third material;
 - exposing the third material to form a third SU8 cover layer defining a nozzle;
 - and
 - developing to remove resist and third material.

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